

Kimberly-Clark Experimental Mill

Annual Report for 2017

Kimberly-Clark Experimental Mill (X-Mill) applied for the Green Tier program on February 3, 2006 and was formally accepted into the program as a Tier 1 participant on September 6, 2006. The X-Mill submitted application materials for participation as a Tier 2 participant in June 2009 and a Tier 2 contract was signed on January 18, 2012. On February 14, 2017, the X-Mill successfully transitioned from Tier 2 participation to Tier 1 participation.

The X-Mill is located in Neenah, WI and currently employs approximately 30 people. The facility's primary function is to develop and deliver a continuous stream of innovative product and process solutions for primarily the Family Care business sector but also for other business sectors as well. Research projects piloted at the X-Mill have led to and continue to lead to realization of energy savings, waste minimization and other environmental initiatives at other Kimberly-Clark facilities throughout the United States.

Green Tier Superior Environmental Performance:

Environmental Management System

Implementation of an EMS consistent with the “functional equivalency” requirements of Wisconsin Statute §299.83(1)(dg):

- A written site-specific EMS has been prepared and implemented. An internal audit of all elements of the X-Mill EMS in November 2017 to measure compliance with the “functional equivalency” requirements of Wisconsin Statute §299.83(1)(dg). Specific improvement opportunities are addressed through a continuous action plan process.
- EMS program elements are reviewed on a monthly basis (at a minimum) by the facility Environmental Department. An annual meeting is held to review the EMS with facility management.

Commitment to X-Mill Environmental Policy Statement

It is the policy of the X-Mill to promote, support, and continuously improve Environmental, Health & Safety Management Systems. We will aggressively manage these systems in a manner that drives towards elimination of loss to People, Equipment, Material, and Environment.

The X-Mill is committed to this policy by:

- Complying with relevant EH&S laws, regulations, and corporate policies.
- Providing a safe, healthy work environment which focuses on Zero Injuries of Any Kind (ZIAK).
- Establishing a culture that ensures we aggressively manage any potential negative impact to the environment.
- Continuous improvement of EH&S performance by actively identifying and reducing hazards, risks, and variability.

- Educating employees on EH&S principles including how to identify and reduce job-associated hazards, risks, and variability.

Training

Commitment to training employees on their roles to assist in maintaining a facility that is environmentally compliant:

- Annual Hazard Communication refresher training is required of all employees and researchers/customers.
- Annual General Environmental Awareness training (which includes EMS awareness training) is required for all employees. Additional focused Waste Management and Spill Prevention Control and Countermeasure refresher training is provided annually to employees with roles in waste management or spill control activities.
- All contractors are provided orientation training on environmental and EMS requirements.
- Recycling program elements and significant environmental aspects discussions are included the X-Mill orientation program for visitors/new employees.

Economic and other benefits of participating in Green Tier

Participation in Green Tier has accelerated the environmental cost reduction and loss control initiatives at our facility. Other initiatives include:

- Participation in the annual Scott Get Up & Ride Wisconsin Bike Challenge (co-sponsored by Scott® Brands and Bicycle Federation of Wisconsin) in which employees used bicycles as alternative transportation to work (totaling over 116,000 miles since 2011).
- Bi-monthly local blood drives through the Community Blood Center.
- Participation in the Adopt-a-Family and United Way campaigns, Housing Partnership of the Fox Cities, Advocap Fall Cleanup Program, and Big Brothers Big Sisters Golf Tournament.

2017 Projects

Waste Reduction:

- 100% of scrap metal is recycled (a total of approximately 61 tons during 2017).
- An average of 128 metric tons of proprietary tissue waste was converted to fuel pellets in 2017.
- Approximately 187 metric tons of broke (manufactured tissue waste, non-proprietary) was recycled in 2017.
- Continued re-use of raw materials to include cores, headers, and bags.

Energy:

- Completed the following energy reduction projects during 2017:

- Replaced eight older cooling units containing R-22 refrigerant with more efficient units containing more environmentally friendly refrigerant.

Groundwater Remediation:

- Continued with quarterly cleaning and monitoring of performance of GWRS-7, GWRS-9, BW-2 and P-9C pumps and wells in order to maintain optimal operating efficiency. Also transitioned BW-2 to an electric pump.
- Decommissioned the carbon tanks from the remediation system and recycled the steel from the tanks.
- Evaluated the humidification system and modified it to ensure that the system operates as efficiently as possible.

2018 Initiatives

- Continue to reduce utility consumption. Future energy saving projects may include exploring options for carbon footprint reduction and alternate energy sources (i.e., solar, wind, water); evaluating automated utility tracking systems; replacing fans with more energy efficient models; turning off HVAC systems at night and on weekends; and installing motion sensors/timers in lower use areas of mill (e.g., maintenance mezzanine).
- Continue to reduce water consumption. Future water saving projects may include additional reduction of EFU vacuum seal water consumption, installation of pressure regulators on EFU shower booms, replacement of remaining non-closed loop HVAC systems to closed loop systems or modification such that cooling water may be reused in processes, installing a main process water shut off valve (at end of day/week, can be closed so downstream leaks are prevented), and vacuum pump inductor installation to reduce seal water needed by recycling water within the pump (expected 50% savings).
- Continue to explore options for recycling or reduction of additional non-hazardous wastes, including trial material.
- Continuing commitment to advancing groundwater remediation:
 - Evaluate current subsurface site conditions in conjunction with research of new in-situ treatment methods for use at the site that may provide for shorter operational life of the remediation system.

History (2016 – 2006)

Waste:

- Implemented mill-wide consumer products recycling during 4Q 2012 (e.g., plastic drink bottles, aluminum cans, waste food containers, etc.), resulting in approximately 80% of consumer wastes being recycled versus landfilling.
- An outlet for office waste was established in 2006 so that 100% of office waste is recycled. The same vendor is used for office waste and broke.
- 100% of wood pallets are recycled (a total of approximately 3,000 pallets since 2007). Reusable plastic pallets were purchased in 2009 and are now utilized in place of wood pallets in areas where there is high potential for damage to the pallets due to high traffic/movement of material.
- Through a chemical approval process, chemical inventory has been reduced by 75% since 2004. The chemical management process allows the X-Mill to control chemical waste volume. In addition, when possible, chemicals are ordered in smaller quantities to minimize the amount of waste.
- The X-Mill participates in a supervised destruct program for proprietary material generated as part of the paper making process. This material is sent to a waste to energy facility to be made into fuel pellets, thereby reducing landfill waste (approximately 1,450 tons since 2005).
- Since 2010, reduced trash compactor pickups from approximately 4 per year to 1 per year due to recycling efforts.
- An outlet for waste plastic pails was established so that 90% of plastic pails are recycled.
- Due to renovation projects within the facility, lead paint and asbestos containing materials (carpet mastic, plaster ceilings, floor tiles, and piping insulation) in an approximately 200 square foot area (fourth floor office) were identified and remediated/removed.
- Double-sided, non-color printing is utilized throughout the Mill as a default setting for all document printing.

Energy:

- An ultrasonic air leak audit was conducted in 1Q 2016 to identify leaks within the X-Mill compressed air equipment. All leaks identified were corrected by 4Q 2016.
- Installation of two economizers on drive room HVAC systems which resulted in approximately 1,500 kw/hr in energy savings.
- Replaced 3,000 fluorescent lamps with LED lamps, which are approximately 50% more efficient.
- Installed pulp lab steam control valve to regulate the amount of steam used for the dryer, which resulted in less steam being used and less heat being output into the room (thereby resulting in less cooling needed to maintain the temperature in the room).

- During 2014, replaced a 22-year old compressor with a more efficient variable speed drive compressor. The energy efficiency of the new compressor will save approximately 154,000 kilowatt hours of electricity annually.
- An air leak audit was completed in 2013 and 18 air leaks were discovered. All air leaks have been fixed with an estimated 39.0 cfm savings.
- An energy audit was conducted in December 2012. Potential energy saving projects identified as the result of the audit are being explored (dependent on resources available).
- Steam trap and ultrasonic air leak audits were conducted during 2012. Three steam traps were replaced and all air leaks were repaired (35 were identified). The identification and correction of the leaks has reduced the amount of electricity used to run the equipment to meet the operational needs of the X-Mill. Additional receiver tanks were added to the air compressor system in 2011 to reduce the number of times to compressor cycles on/off. In addition, an air dryer was replaced with a more efficient refrigerated dryer and one 125 hp motor was removed.
- Replaced a total of 192 400-watt metal halide fixtures with high efficiency fluorescent fixtures since 2006 (a total reduction of 115,316 kilowatt hours). Replaced 151 250-watt metal halide fixtures with high efficiency fluorescent fixtures since 2008 (a total reduction of 52,405 kilowatt hours). Replaced 175 175-watt metal halide fixtures with high efficiency fluorescent fixtures during 2009 (total reduction of 13,195 kilowatt hours). The total reduction of electricity consumption since 2006 is 180,916 kilowatt hours.
- An ultrasonic air leak audit was conducted in November 2008 to identify leaks within the X-Mill compressed air equipment. All leaks identified were corrected during the first quarter of 2009.
- The X-Mill continues to employ a fork truck usage reduction program, implemented during 2007, by utilizing battery operated power workers. This practice thereby reduces the amount of propane fuel utilized and carbon dioxide emissions into the atmosphere.
- Adjusted additional HVAC controls to allow for valves and dampers to be configured so the air compressor does not run when the building is unoccupied.
- Replacement of older cooling units containing R-22 refrigerant with more efficient units containing more environmentally friendly refrigerant.
- Programmable thermostats are utilized at the X-Mill facility (programmed based upon a 10 hour day, five days per week) to reduce energy usage when the facility is not in operation (e.g., nights, weekends, holidays, etc.). Additionally, interior facility lighting is programmed to turn off each weekday at 4:30 pm and lights remain off during weekend (unoccupied) periods.
- HVAC digital controls were adjusted to allow for valves and dampers to be configured so the air compressor does not run at night when the building is unoccupied.
- Replaced air activated valves with electric ones throughout the mill to either reduce or eliminate air compressor usage in the evenings and on weekends.

- Synchronized run time of the air dryer (10hp motor) with the on/off cycle of the associated air compressor, eliminating 14 hours of air dryer run time per day of its operation.

Water:

- Completed the following water reduction projects during 2016, which resulted in a water use reduction of approximately 9 million gallons:
 - Reduction of EFU vacuum seal water consumption
 - Replacement of remaining EFU shower tips
 - Replacement of six non-closed loop HVAC systems to closed loop systems or modification such that cooling water may be reused in processes
- Replaced air handling units from water-cooled to air-cooled, variable valve units in October 2015. The change will result in approximately 15 million gallons of annual water savings.
- Twenty-two EFU shower tips were replaced in 2015, providing a savings of 8 gallons of water per minute, per tip, which results in a savings of 7 million gallons per year.
- During 2014, installed flow meters on the four of the most used vacuum pumps and controlled flow to pump specifications (versus leaving valve completely open). This change reduces water consumption by 8.7 million gallons per year.
- Established a process to reclaim and reuse fabric shower water from the #1 fabric run on the tissue machine during 2014, reducing water consumption by 4 million gallons per year.
- Rerouted cooling water from an HVAC unit from the third floor conference room in 2014 for reuse in process.
- Two water-cooled air conditioners were replaced during 2012 with one self-contained, closed loop system, thereby reducing water consumption.
- Replaced the open loop cooling system on the large air compressor with a closed loop system in December 2011, thereby reducing water consumption by approximately 65,000 gallons per day.
- Reduced operating pressure for equipment wash up hoses from 160 psi to 60 psi during 2008, thereby reducing water used for machine washing by approximately 50%.
- Whitewater tank capacity was increased to 30,000 gallons (from 20,000 gallons), allowing for additional ability to recycle process water.
- Installed flow meters on the six remaining vacuum pumps and controlled flow to pump specifications (versus leaving valve completely open). This change reduces water consumption by approximately 4 million gallons per year.
- Established a process to reclaim and reuse fabric shower water from the #2 fabric run on the tissue machine, reducing water consumption by approximately 1.4 million gallons per year.

Groundwater remediation (since 2008):

- During 2016, the following groundwater remediation activities occurred:
 - Following the optimization tests and discussion of results with the WDNR, RW-6 pump was shut off toward the end of 2016 as a result of the 2015 optimization test – approval received from the WDNR, reducing operating costs
 - Replaced well and pump at GWRS-7 and cleaned out discharge line due to well collapse. Also replaced the pump in GWRS-9. These activities occurred after discovery during semi-annual maintenance activities.
 - Annual cleaning of BW-2 and P-9C for optimal operating efficiency
- During 2015, the following groundwater remediation activities occurred:
 - The CSM was updated and the use of RegenOx was evaluated for in-situ enhancement for plume treatment. It was determined that this treatment was not viable at this time due to lack of proven cases for this particular contaminant. In addition, it was determined that it is unlikely the treatment system would be able to shut down completely in the next 2 to 3 years.
 - Following a meeting with the WDNR, it was determined that natural attenuation could be a viable remedy in the future, but not at this time. Further discussions with the WDNR included performing a system optimization test to increase the recovery performance of the treatment system. The WDNR agreed and the test was performed between September and November 2015.
 - We have continued to monitor the performance of wells GWRS-9 and RW-2, as well as others that have high concentrations of contaminants. The flow meters for GWRS-7 and GWRS-9 were malfunctioning due to the DNAPL present in these wells as identified during the system optimization test.
 - An extraction well maintenance program was completed during the system optimization test, the results of which will be presented in a report to the WDNR, with recommendations, in early 2016.
- During 2014, the following groundwater remediation activities occurred:
 - Developed an extraction well maintenance program in order to optimize system extraction efficiency.
 - Evaluated the potential ability to shut down a few shallow ground water recovery wells without affecting system performance, which would have saved energy and reduced maintenance and overall operating costs by reviewing and revising the CSM. However, was determined not feasible at this time.
 - As a result of the extraction well maintenance, increased the rate of VOC recovery.
- During 2013, the following groundwater remediation activities occurred:

- Rehabilitated extraction wells BW-2 and P-9C by rehabbing the pumps and cleaning the screens in each well.
- Evaluation of shutting down some of the shallow extraction wells indicated that the existing system needs to operate as is for the time being due to the fluctuations in free product and groundwater contaminant concentrations observed in the shallow wells. The more in depth analysis undertaken during the CSM revision may provide justification for modifications to the extraction system or other actions which may accelerate site closure.
- Reduced the groundwater level monitoring program from monthly to quarterly monitoring.
- Added flow meters to P-9C and BW-2 to better assess system performance on a real time basis and aid in evaluation of system performance and scheduling of well maintenance activities.
- During 2012, the following groundwater remediation activities occurred:
 - Monitored levels of DNAPL and determined that the current treatment methods are sufficient to move toward closure.
 - A pump saver was added to K-C No. 2 in October which will save energy.
 - The Operations manual for the remediation system was updated to reflect recent changes to the system.
 - The CSM was updated to evaluate if additional potential system upgrades were needed and/or if there are additional contaminant sources that need to be addressed. The evaluation indicated that there are no immediate actions which can be taken to enhance the systems performance.
 - A vapor intrusion investigation was performed which indicated that the plume beneath the building does not pose a threat to indoor air quality.
 - Soil samples collected in the basement of the building were not impacted to a depth of about 18 feet below grade. Dense clays were encountered which are restricting migration of the plume.
- Based on one year of data following system upgrades, the pump was removed from K-C No.1, which was subsequently converted to a monitoring well. In addition, the pump in P-9C was replaced. These steps have reduced energy consumption and system maintenance costs.
- During 2011, rerouted several of the submersible pump shallow well discharge points from the equalization basin to the sanitary manhole which reduces the system downtime during high groundwater water levels and reduces operating costs.
- During 2010, AECOM continued to collect data regarding the effect of the remedial actions performed in 2009. Other actions included mothballing the onsite remediation system and re-routing collected ground water to the municipal WWTP, as well as the replacement of pumps in the deep ground water extraction wells KC-1 and KC-2.
- As a result of the investigations performed to upgrade the CSM, additional contaminated soils were excavated from beneath the parking lot in August and

September 2009. AECOM was also contracted to upgrade the existing operating groundwater extraction remediation system. These upgrades were completed in December 2009 into 2010 based upon the results of the prior modifications.

- Hired an outside contractor, AECOM, in 2008 to review historical and current site data to develop and maintain a CSM for the property which describes historical site usage and potential sources of on-site and off-site sources of contamination. The CSM was completed in May 2009. Recommendations were made to reduce the potential contaminate sources which were contributing to the groundwater contaminant plume and to modify the configuration of the existing ground water extraction wells.

Other projects

- Upon identifying a leak in the X-Mill's process effluent line during 2013, effluent was immediately diverted to an alternate discharge point. Divers were hired to investigate the scope of the leak and a 16 inch long, half inch wide crack was discovered in the 12 inch diameter effluent pipe, which had released untreated tissue fiber to the canal bed. The divers used vacuum equipment to remove the tissue fiber and it was disposed via the Neenah Paper water treatment system. Once the spill was contained and cleaned up, the X-Mill took action to replace a 40 foot section of the effluent line and added additional ballast to reduce the risk of future issues. In 2014, additional concerns with the effluent line were discovered and piping was redesigned and replaced.
- In April 2009, the X-Mill sold a portion of a parking lot area on the west side of the property (approximately 1 acre) to the City of Neenah for re-development into a permanent green space.
- As a result of City of Neenah re-development activities, the X-Mill has negotiated with the local utility provider to remove and relocate power lines located on supports within Little Lake Butte des Morts. The relocation process began in September 2009, with installation of temporary power lines in November 2009. Removal of supports occurred during the fall of 2010.